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April 6, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

“Determinations of the Magnetic Inclination and Force in the British Provinces of Nova Scotia and New Brunswick in the summer of 1847.” By Professor George W. Keely, of Waterville College, Maine, United States. Communicated by Lieut.-Col. Sabine, R.A., For. Sec. R.S.

The observations recorded in this paper are of two kinds; first, those for the relative total force, which were made with a pair of Lloyd needles and an inclination-circle, seven inches in diameter, with two verniers reading to single minutes; and secondly, those for the absolute horizontal force made with a unifilar magnetometer. After a detailed description of these instruments, the results of the observations are given, occupying several pages of tables.

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April 13, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

“Minute structure of the Organ of Taste in Vertebrate Animals.” Part I. By Augustus Waller, M.D. Communicated by Richard Owen, Esq., F.R.S.

The author states that, in 1839, his attention was first directed to the organ of taste on discovering the peculiar advantages for microscopic examination which are offered by the tongue of the living frog. When prepared in the manner he describes, it is much more transparent than the web of the foot; and its papillæ, mucous membrane, blood-vessels, nerves, muscular fibres, &c. may all be examined during life.

He subsequently found that, contrary to the opinion of anatomists,

it contains two species of papillæ distinct in their structure, corresponding to the conical and fungiform papillæ of man.

In the present communication he describes the result of his further researches on the frog's tongue, principally with regard to the ultimate termination of the nerves in the papillæ and the precise nature of the functions of these papillæ in the act of taste, and demonstrates a similar disposition of the nervous extremities in man and the rest of the mammiferæ.

After giving a brief account of the researches of former anatomists, he proceeds to state his method of preparing the frog for examination, which consists in rendering it insensible by exposing it to the vapour of ether or of various other volatile agents. The tongue is then expanded so as to render it perfectly transparent. The conical papillæ he describes as small cones, sometimes simple, sometimes compound. They are composed of globular, or wedge-shaped epithelial cells, generally with a medullary stem running up the centre, giving off small processes to the separate epithelial cells. Each of the papillæ presents, near its summit, a small aperture. The fungiform papillæ are distinguished from the former by their globular shape, larger size, and above all by the existence of a coil of capillary vessels within them, containing blood in a state of active circulation. At their summit or at their sides, the vascular coils are extremely superficial and merely covered by an exceedingly thin membrane. Besides the blood-vessels, these papillæ are invariably found to contain a nerve and also muscular fibres. The nerve consists of about eight or ten simple tubules. At the base of the papillæ it forms several loops, and afterwards ascends between the capillary vessels towards the summit of the papillæ, where its tubules diverge and terminate in abrupt extremities. The author terms that part of the papillæ where the membrane is so attenuated, and where the vessels ramify and the nerves terminate, the *neuro-vascular area*; the muscular fibres ascend into the papilla in the same direction as the nerves, and after nearly reaching the summit, are lost in the tissue surrounding the neuro-vascular area. The nerves of the conical papillæ, contrary to the former, never terminate in abrupt extremities, and consist of a network of nearly single tubules. Neither the nerves nor the vessels of these papillæ ascend into their interior, but are only spread out at their base.

The author deduces from these and other observations which are minutely described in his paper, that the fungiform are the papillæ of taste and the conical those of touch. He considers that by reason of the thinness of the membrane at the neuro-vascular area, a sapid substance must quickly traverse it; the nerves immediately beneath, like the spongioles of the roots of a plant, being acted upon by the sapid substance, convey the sensation of taste to the brain. The active circulation in the capillaries at the same spot appears to be for the purpose of removing by endosmosis the sapid substance from the nerve so as to render it capable of receiving a fresh impression. A further peculiarity exists with respect to these papillæ, which is that they present at their surface an active ciliary move-

ment of which the conical papillæ are devoid. This movement appears to be for the purpose of promoting absorption and of removing any foreign particles from their surface.

He regards the conical papillæ as strictly destined for tactile purposes, on account of the thickness of their epithelium, and the presence of the nervous ramifications at their base, which are similar to those existing at the under surface of the tongue, where the sensation of taste does not exist and the tactile powers alone are present.

The author has extended his observations to other animals, to the mammiferæ, and to Man in particular, and states that in all these the same difference exists between the two species of papillæ. He promises in his next paper on this subject to describe the structure of the mammiferæ.

This paper is illustrated by several drawings.

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May 4, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

"The Brain the sole centre of the Human Nervous System."  
By Edwin Lee, Esq. Communicated by Samuel Solly, Esq., F.R.S.

It has been inferred by many physiologists, from experiments made on the lower animals, that portions of the human nervous system are isolated and independent of each other; but from the circumstance that in these animals the brain is only a small appendage to the rest of the nervous system, while in the human species it is the principal portion, the author takes an opposite view of the subject. In man, the grey matter, which is the source of the power of the brain, is largely agglomerated in that organ, but is only diffused in comparatively minute proportions throughout the other parts of the nervous apparatus, which, when detached from the central organ, speedily lose the power of exciting muscular contraction, because this power is derived exclusively from the brain, and only such a portion is retained in the grey matter of the spinal cord and the ganglia of the sympathetic as is requisite for the immediate actions of the parts which they supply with nerves.

The opinions of Galen, of Willis, and of the more recent physiologists, Louget, Muller, Dugès, Carus, Pinel, Foville, Flourens, Cruveillier, are cited at some length in corroboration of the views of the author, and in opposition to those of Bichat, and others of the older physiologists, together with those of Sir C. Bell, Mr. Grainger, Dr. M. Hall, Kolliker, Stilling, and others, and tending also to disprove the excito-motory theory of Dr. M. Hall, as regards its applicability to medical practice. Quotations to the same effect are given from Valentin, Volkmann, Fauvel, Mery, Cabanis, and Legallois; and reference is likewise made to pathological illustra-